(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 807 879 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.11.1997 Bulletin 1997/47

(51) Int Cl.[6]: **G06F 1/16**

(21) Application number: **97302491.2**

(22) Date of filing: **11.04.1997**

(84) Designated Contracting States:
DE GB IT

(30) Priority: **17.05.1996 JP 123039/96**

(71) Applicant: **SHARP KABUSHIKI KAISHA**
Osaka 545 (JP)

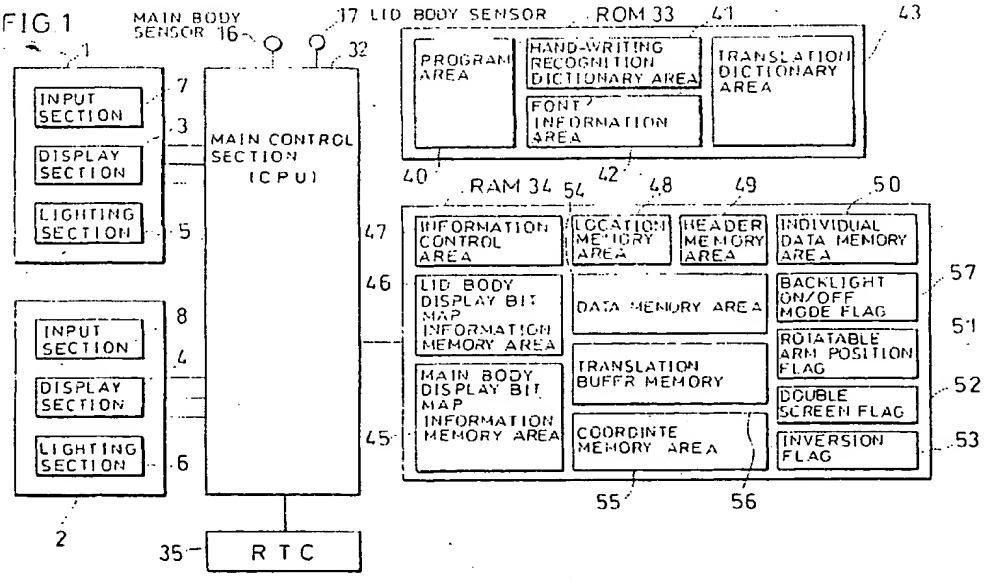
(72) Inventors:
- **Haneda, Isamu**
  Soraku-gun, Kyoto 619-11 (JP)
- **Isoe, Toshio**
  Tenri-shi, Nara 632 (JP)

(74) Representative: **Brown, Kenneth Richard et al**
R.G.C. Jenkins & Co.
26 Caxton Street
London SW1H 0RJ (GB)

(54) Information processing apparatus including a main body and a lid body

(57) An information processing apparatus having a main body and a lid body is configured so that the lid body can be switched between a closed state, a stacked state, a double screen state and an inverted state. Each of the main body and the lid body has a display section for displaying information and an input section composed of a transparent tablet and provided on the display section. As a sensor or the like detects the lid body in one of the four states, a control section of the information processing apparatus controls the display section so that a screen on the display section is appropriate to the detected state of the lid body. The control section also controls the lighting section for lighting the display section appropriately to the detected state of the lid body. This realizes appropriate display in accordance with usages of the information processing apparatus and offers an easy-to-operate and easy-to-use information processing apparatus. Besides, the lighting section is turned on/off according to needs, and therefore it is possible to prevent heat generation and to restrain power consumption.

FIG 1



EP 0 807 879 A2

the lid body is in the double screen state. This can save power consumption of the information processing apparatus. Additionally, this can prevent heat from being accumulated in the display section of the main body, thereby protecting the display sections of the main body and the lid body from heat.

Another object of the present invention is to offer an information processing apparatus that can be easily operated by appropriately changing display state accordingly to the usage of the lid body when a various kinds of display are carried out by making use of a plurality of display sections.

An information processing apparatus in accordance with the present invention

has a main body and a lid body, each of the main body and the lid body having a display section for displaying information, and

in order to accomplish the above object, includes:

connecting section for connecting the lid body to the main body so that the lid body can be switched between three states: a closed state where the lid body serves as a lid to cover the main body with the display section of the lid body facing downward, a stacked state where the lid body is stacked on the main body with the display section of the lid body facing upward, and a double screen state where both the display sections are visible;

lid body detecting section for detecting in which of the three states the lid body is; and

control section for controlling a display state of the display section of the main body and a display state of the display section of the lid body according to a result detected by the lid body detecting section.

The information processing apparatus can produce an appropriate display state by detecting the state of the lid body with the lid body detecting section, and controlling the display stated of the display sections of the main body and the lid body with control section accordingly to a result detected by the lid body detecting section.

For example, when the lid body is moved into the stacked state, the information processing apparatus can give a priority to information of the display section of the main body or of the lid body which includes the cursor and automatically display all that information on the display section of the lid body. This, even when the display section of the main body is being used for an input operation, eliminates a need for an operation of scrolling the cursor from an input position of the display section of the main body onto the display section of the lid body. Therefore, even when display on the display sections of the main body and the lid body is changed, the input position can be shown clearly, thereby offering a user-friendly display environment.

A preferred embodiment of an information processing apparatus in accordance with the present invention

has a main body and a lid body, each of the main body and the lid body having a display section for displaying information, and

includes:

connecting section for connecting the lid body to the main body so that the lid body can be switched into an inverted state where the display section of the main body is visible and the display section of the lid body is inverted on the backside of the main body;

lid body detecting section for detecting that the lid body is in the inverted state; and

control section for, when the lid body detecting section detects that the lid body is in the inverted state, controlling so that the display section of the main body and the display section of the lid body display the same information and so that the display section of the lid body displays the information upside down.

The information processing apparatus, when the lid body is moved into the inverted state, can perform display which can be recognized easily by a person sitting opposite the user by displaying the same information on the display section of the lid body as the information on the display section of the main body, and turning upside down the display on the display section of the lid body. Besides, the user only needs to operate so that the lid body is switched to the inverted state, which facilitates presentation by the user to another person opposite him.

For a fuller understanding of the nature and advantages of the invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1, illustrating an embodiment of the present invention, is a block diagram showing a configuration of a main part of an information processing apparatus.

Fig. 2 is a block diagram showing a configuration of a main part of a main body and a lid body of the information processing apparatus.

Fig. 3 is a perspective view showing an appearance of the information processing apparatus in a double screen state.

Fig. 4 is a perspective view showing an appearance of the information processing apparatus in a closed state.

Fig. 5 is a perspective view showing an appearance of the information processing apparatus in a stacked state.

Fig. 6 is a perspective view showing an appearance of the information processing apparatus in an inverted state.

Fig. 7(a) is a perspective view showing a main body sensor using an opposing type light sensor.

the link body of the lid body 2 via a bush. As a result, the rotatable arms 9 can be held in any angle, using friction between the shafts 14 and 15 and the bushes.

A purpose of arranging the lid body 2 to be slidable with respect to the rotatable arms 9, is to prevent the main body 1 from interfering with rotation of the lid body 2. The mechanism of sliding the rotatable arms 9 is unnecessary if the rotatable arms 9 are made to be freely adjustable in length. Another structure for eliminating such a mechanism of sliding the rotatable arms 9 is to provide a notch on the back of the main body 1 so as to prevent the main body 1 from interfering with rotation of the lid body 2.

Any of the arrangements may be adopted to switch the lid body 2 between the four states: the closed state where the lid body 2 covers the main body 1 with the lid body display section 4 facing downward as shown in Fig. 4, the stacked state where the lid body 2 is stacked on the main body 1 with the lid body display section 4 facing upward as shown in Fig. 5, the double screen state where both the main body display section 3 and the lid body display section 4 are visible as shown in Fig. 3, and the inverted state where the lid body display section 4 is inverted on the back side of the main body 1 as shown in Fig. 6. The main body 1 has a power source switch 30 and a pen holder 31 for holding a pen used for hand-writing input through the tablets of the main body input section 7 and the lid body input section 8.

In the main body 1 are provided, as shown in Fig. 1, control means composed of a main control section 32, an ROM 33, an RAM 34, a real time clock (RTC) 35 and an I/O port; an interface; circuits such as the display sections 3 and 4, and the lighting sections 5 and 6; and a power source section for providing a rated-voltage power supply to the control means. Cables connecting the circuits of the main body 1 to those of the lid body 2 run in the rotatable arm 9.

The information processing apparatus has lid body detecting means for detecting the states of the lid body 2. The lid body detecting means is composed of a main body sensor 16, shown in Figs. 7(a) through 7(c), for detecting rotation of the rotatable arms 9 with respect to the main body 1 and a lid body sensor 17 for detecting rotation of the lid body 2 with respect to the rotatable arms 9 as shown in Figs. 8(a) through 8(c).

The main body sensor 16 includes an opposing type light sensor 18, such as a photointerrupter, provided to the main body 1 near the base ends of the rotatable arms 9 as shown in Fig. 7(a). The opposing type light sensor 18 is turned on/off depending upon whether or not a protrusion 19 provided in a protruding manner at the base end of the rotatable arm 9 blocks light of the opposing type light sensor 18. That is, when the lid body 2 is in the stacked or closed state, the protrusion 19 of the rotatable arm 9 blocks the light, and the opposing type light sensor 18 detects the blockage of the light and turns on.

Another example of the main body sensor 16, as shown in Fig. 7(b), is a reflection type light sensor which is a combination of a light emitting diode (LED) 20 and a phototransistor 21. Reflective agent is applied to the protrusion 19 of the rotatable arm 9. Light irradiated by the LED 20 is reflected by the protrusion 19, and the reflected light is detected by and turns on the phototransistor 21.

These two examples of the main body sensor 16 are non-contact switches. Fig. 7(c) shows a contact switch using a micro switch 22. The protrusion 19 of the rotatable arm 9 contacts and turns on the micro switch 22.

The lid body sensor 17, as shown in Figs. 8(a) through 8(d), is composed of an isolating body 23 of a disc shape disposed around the shaft 15 at the pointed end of the rotatable arm 9, an "A" switch 24 and a "B" switch 25 provided to a link body of the lid body 2 along the outer periphery of the isolating body 23, and conductive bodies 26 and 27 attached respectively to the higher front portion and the lower front portion of the outer periphery of the isolating body 23. The B switch 25 is disposed to the lid body 2 near the lid body display section 4, whereas the A switch 24 is disposed 90 degrees behind the B switch 25 clockwise. The A switch 24 and the B switch 25 are turned on as coming into contact with the conducting bodies 26 and 27 respectively.

The A switch 24 is turned on either when the lid body 2 is in the inverted state and in contact with the conductive body 26 as shown in Fig. 8(d) or when the lid body 2 is in the closed state and in contact with the conductive body 27 as shown in Fig. 8(a). The B switch 25 is turned on either when the lid body 2 is in the double screen state and in contact with the conductive body 26 as shown in Fig. 8(b), or when the lid body 2 is in the closed state and in contact with the conductive body 27 as shown in Fig. 8(a). Both the A switch 24 and the B switch 25 are turned off when the lid body 2 is in the stacked state as shown in Fig. 8(c).

The states of the lid body 2 can be detected with outputs from the two sensors 16 and 17. That is, the switch of the main body and the A switch 27 are ON in the closed state; the switch of the main body is OFF and the B switch 25 is ON in the double screen state; the switch of the main body is ON and the A switch 24 and the B switch 25 are ON in the stacked state; and the switch of the main body is OFF and the A switch 24 is ON in the inverted state.

In the present embodiment, the lid body sensor 17 has the isolating body 23 disposed with the rotatable arm 9, and the A switch 24 and the B switch 25 disposed with the lid body 2. However, the lid body sensor 17 may have the isolating body 23 disposed with the lid body 2, and the A switch 24 and the B switch 25 disposed with the rotatable arm 9.

Fig. 1 shows a control block diagram of the information processing apparatus configured as above. The main control section 32 composed of a CPU has both new and old functions. Examples of the old functions

that the lid body 2 is in the stacked state creates no problems.

However, it can also be judged from this output from the lid body sensor 17 whether the lid body 2 is in the closed state or in the stacked state. If the rotatable arm position flag 51 is 1, and the A switch 24 is ON, the lid body 2 is in the closed state, whereas if the A switch 24 and the B switch 25 are both OFF, the lid body 2 is in the stacked state.

The following description will explain control of a display state and a lighting state in accordance with the states of the lid body 2. Inputting and editing operations with "Telephone Directory" will be described as an example. First, Telephone Directory is selected with the lid body 2 in the double screen state as shown in Fig. 3. As Telephone Directory is selected, information stored as a telephone directory is displayed on the lid body display section 4.

At first, the data item on the top of the lid body display section 4 is displayed in a black & white-reversed manner. As the name item "Yamada Ichiro" displayed on the lid body display section 4 is pentouched, it is detected that the touched area is the location where "Yamada Ichiro" is being displayed, and the item area is displayed in a black & white-reversed manner as shown in Fig. 11(a). Then the RAM 34 is searched for detailed information about Mr. Yamada Ichiro, and personal data of Mr. Yamada Ichiro is displayed on the main body display section 3. For example, when "Address" is to be changed, the user pen-touches the "Address" input box, an item on the main body display section 3. The touched area is displayed in the same black & white-reversed manner, and an input area of the main body input section 7 is displayed on the main body display section 3 for new data to be inputted.

The following description will explain an operation for the lid body display section 4 to be stacked on the main body 1, i.e., for the lid body 2 to be moved to the stacked state. As shown in Fig. 12, a lower portion of the lid body 2 is lifted. As the lid body 2 has been moved to a horizontal level, the lid body 2 is placed onto the main body 1 together with the rotatable arm 9 to move into the stacked state shown in Fig. 5. The main control section 32 carries out control of changing into a single screen display according to the states of the rotatable arm position flag 51 representing the rotational position of the rotatable arm 9 and the states of the double screen flag 52 representing the position of the lid body 2.

Referring to the flow chart in Fig. 13, the following description will explain detection of the lid body 2 in the stacked state and control after that detection. In ST 1 the rotatable arm position flag 51 is read out in order to detect that the lid body 2 is stacked on the main body 1. In ST 2 the content of the rotatable arm position flag 51 is judged: if the rotatable arm position flag 51 is 1, the process proceeds to ST 3, and if the rotatable arm position flag 51 is 0, the process returns to ST 1.

The cursor location is detected in ST 3, and it is judged in ST 4 whether the cursor is on the main body display section 3 or the lid body display section 4. If the cursor is on the main body display section 3, the process proceeds to ST 5. It is judged in ST 5 whether the item where the cursor is located includes more lines than the number of lines set for the character display of the main body display section 3. In this embodiment, the number of lines is set to five as an example. If the item where the cursor is located includes more than five lines, the process proceeds to ST 6, and the line number (1 or larger) of the line immediately before the line where the cursor is located is substituted in the memory of the location memory area 48. For example, if the cursor is in line 7 of the item where the cursor is located, "6" is substituted in the memory of the location memory area 48. However, if the cursor is in line 1 of the item where the cursor is located, "1" is substituted in the memory of the location memory area 48.

If the number of lines of the item where the cursor is located is five or less on the main body display section 3, the process proceeds to ST 7, and the starting line of the item where the cursor is located is substituted in the memory of the location memory area 48. This is a process for displaying all data in the item where the cursor is located if it is possible, and, otherwise, for starting the display with the preceding line so that the user can understand the context of the displayed data easily.

In ST 8 bit map information for five consecutive lines starting with the line substituted in the memory of the location memory area 48 is stored in the main body display bit map information memory area 45. In ST 9 a header portion 60 displayed on the lid body display section 4 is stored in the header memory area 49 of the RAM 34 so as to make it easier to understand which data is being displayed on the lid body 2. In ST 10 the first item of the data currently being displayed (item "Name" in this case) is stored in the individual data memory area 50.

In ST 11 the lid body display section 4 is cleared. In ST 12 the header portion 60 read out from the header memory area 49 is displayed on the lid body display section 4 as shown in Fig. 11(b). In ST 13 individual data 61 read out from the individual data memory area 50 is displayed, and in ST 14 display data 62 read out from the main body display bit map information memory area 45 is displayed. As the data is displayed, the process proceeds to ST 15. If it is judged in ST 4 that the cursor is on the lid body display section 4, the process proceeds to ST 15 without changing the display.

In this manner, when the cursor is on the main body display section 3, the information of the main body display section 3 is displayed on the lid body display section 4: when the cursor is on the lid body display section 4, the content of the lid body display section 4 is displayed without any change. In this manner, the information processing apparatus is made to give a priority to display of the display screen where the cursor is located. Note that regardless of the cursor location, a half of the

If the cursor is on the main body display section 3 in ST 4, the main body display bit map is saved in the main body display bit map information memory area 45 of the RAM 34 in ST 11. Next, the lid body display section 4 is cleared in ST 12, the lid body coordinate reference point is changed from X to Y in ST 13, and then the content of the main body display bit map information memory area 45 is displayed on the lid body display section 4 in ST 14.

In this manner, when the lid body 2 is moved into the inverted state, information of the same content is displayed on the main body display section 3 and on the lid body display section 4, and the display of the information is turned upside down on the lid body display section 4, so that the person sitting opposite to the user can easily recognize the display.

The following description will demonstrate how the information processing apparatus is used, for example, when two persons using different languages such as Japanese and English sit face-to-face and have a meeting using the translation function. The lid body 2 is positioned in the inverted state as already mentioned, and the user moves the cursor to the screen that is to be shown to the other person. The control here is illustrated in Fig. 17. STs 1 through 7 in Fig. 17 are the same procedure as STs 1 through 7 in Fig. 16.

Next, the content displayed on the lid body 2 is saved in the translation buffer memory 56 of the RAM 34 in ST 8. When the cursor is on the main body display section 3, the content displayed on the main body 1 saved in the translation buffer memory 56 of the RAM 34 in ST 9, and the process proceeds to a translation routine that starts with ST 10.

In ST 10, a sentence, that is a content of the translation buffer memory 56, is translated. At the same time, display coordinates of the words, included in the translated sentence, corresponding one-to-one to words included in the original sentence are made as a table. For example, a Japanese sentence, "これはペンです。", in Fig. 18(a) is translated into an English sentence, "This is a pen."

In ST 11 a Japanese display coordinate is saved in the coordinate memory area 55 of the RAM 34. In ST 12 an English display coordinate is saved in the coordinate memory area 55 of the RAM 34 correspondingly to the Japanese display coordinate. In ST 13 a result of the translation is saved in the lid body display bit map information memory area 46. STs 10 through 13 are repeated until the whole sentence is translated and all the coordinates corresponding to the words are saved.

After the translation routine, in ST 14 the lid body display section 4 is cleared, and in ST 15 the lid body coordinate reference point is changed from X to Y. In ST 16 the content of the lid body display bit map information memory area 46 is displayed on the lid body display section 4. Consequently, a Japanese sentence is displayed on the main body display section 3, and the English sentence translated from the Japanese is displayed on the lid body display section 4 in a reversed manner.

In ST 17 and thereafter, a process is carried out for a case when either the main body display section 3 or the lid body display section 4 is pen-touched. In ST 17 the pen-touch is detected: for example, when the location of "ペン (a pen)" is detected, a special display is carried out in ST 18 so that the block 64 (see Fig. 18(a)) for "ペン on the main body display section 3 is displayed in a reversed or flickering manner. Next, in ST 19 the coordinate memory area 55 of the RAM 34 is searched for the block coordinate of "ペン, and in ST 20 the coordinate location on the corresponding lid body display section 4 is read out. Since the coordinate location on the corresponding lid body display section 4 is the block 65 (see Fig. 18(b)) for "a pen", a special display is carried out in ST 21 so that the block 65 for "a pen" on the lid body display section 4 is displayed in a reversed or flickering manner. The same kind of arrangement for a special display of, for example, displaying the block 64 for "ペン" on the main body display section 3 in a reversed manner is possible, also when the block 65 for "a pen" on the lid body display section 4 is touched.

As mentioned so far, appropriate display and lighting states can be obtained with the information processing apparatus of the present embodiment in accordance to the states of the lid body 2. That is, when the lid body 2 is in the stacked state, the lighting for the main body display section 3 is OFF; when the lid body 2 is in the double screen state, the lighting for the main body display section 3 can be automatically turned on upon opening of the lid body 2 or touching to the main body display section 3. This can save power consumption of the information processing apparatus and eliminate a need for an input operation through the main body display section 3 whose lighting is OFF and which is therefore hard to see, thus improving operability. Additionally, this can prevent heat from being accumulated in the main body display section 3, thereby protecting the main body display section 3 and the lid body display section 4 from heat.

Also, when the lid body 2 is in the stacked state, the information processing apparatus can give a priority to information of either the main body display section 3 or the lid body display section 4 which includes the cursor and automatically display all that information on the lid body display section 4. This, even when the main body display section 3 is being used for an input operation, eliminates a need for an operation of scrolling the cursor from an input position of the main body display section 3 onto the lid body display section 4. Therefore, even when display on the main body display section 3 and the lid body display section 4 is changed, the input position can be shown clearly, thereby offering a user-friendly display environment.

Here, instead of displaying all information on either the main body display section 3 or the lid body display section 4 which includes the cursor, only information near the cursor may be displayed on a part of the lid

that the lighting section of the display section of the main body goes into an ON state.

4. The information processing apparatus as defined in claim 1,

wherein the display sections are liquid crystal display devices.

5. The information processing apparatus as defined in claim 1, further comprising

input means composed of a transparent tablet, provided on the display section of the main body and on the display section of the lid body.

6. The information processing apparatus as defined in claim 5.

wherein if said lid body detecting means detects that the lid body has been switched into the double screen state, and input is made through said input means, said control means controls so that the lighting section of the display section of the main body goes into an ON state.

7. An information processing apparatus including a main body and a lid body,

each of the main body and the lid body having a display section for displaying information,

said information processing apparatus comprising:

connecting means for connecting the lid body to the main body so that the lid body can be switched between three states: a closed state where the lid body serves as a lid to cover the main body with the display section of the lid body facing downward, a stacked state where the lid body is stacked on the main body with the display section of the lid body facing upward, and a double screen state where both the display sections are visible:

lid body detecting means for detecting in which of the three states the lid body is; and

control means for controlling a display state of the display section of the main body and a display state of the display section of the lid body according to a result detected by said lid body detecting means.

8. The information processing apparatus as defined in claim 7,

wherein if said lid body detecting means detects that the lid body has been switched into the stacked state, said control means controls so that information displayed on the display section of the main body is displayed on a part of the display section of the lid body section.

9. The information processing apparatus as defined in claim 7, further comprising

cursor location detecting means for detecting a location of a cursor,

wherein if said lid body detecting means detects that the lid body is in the stacked state, said control means controls so that information of one of the display sections where presence of the cursor is detected by said cursor location detecting means is displayed on the display section of the lid body section.

10. The information processing apparatus as defined in claim 7,

wherein if said lid body detecting means detects that the lid body has been switched into the stacked state, said control means displays on the display section of the lid body a character recognition area through which a character can be inputted.

11. The information processing apparatus as defined in claim 7,

wherein the display sections are liquid crystal display devices.

12. The information processing apparatus as defined in claim 7, further comprising

input means composed of a transparent tablet, provided on the display section of the main body and on the display section of the lid body.

13. An information processing apparatus including a main body and a lid body,

each of the main body and the lid body having a display section for displaying information,

said information processing apparatus comprising:

connecting means for connecting the lid body to the main body so that the lid body can be switched into an inverted state where the display section of the main body is visible and the display section of the lid body is inverted on the backside of the main body;

lid body detecting means for detecting that the lid body is in the inverted state; and

control means for, when said lid body detecting means detects that the lid body is in the inverted state, controlling so that the display section of the main body and the display section of the lid body display the same information and so that the display section of the lid body displays the information upside down.

14. The information processing apparatus as defined in claim 13, further comprising

input means composed of a transparent tablet, provided on the display section of the main body

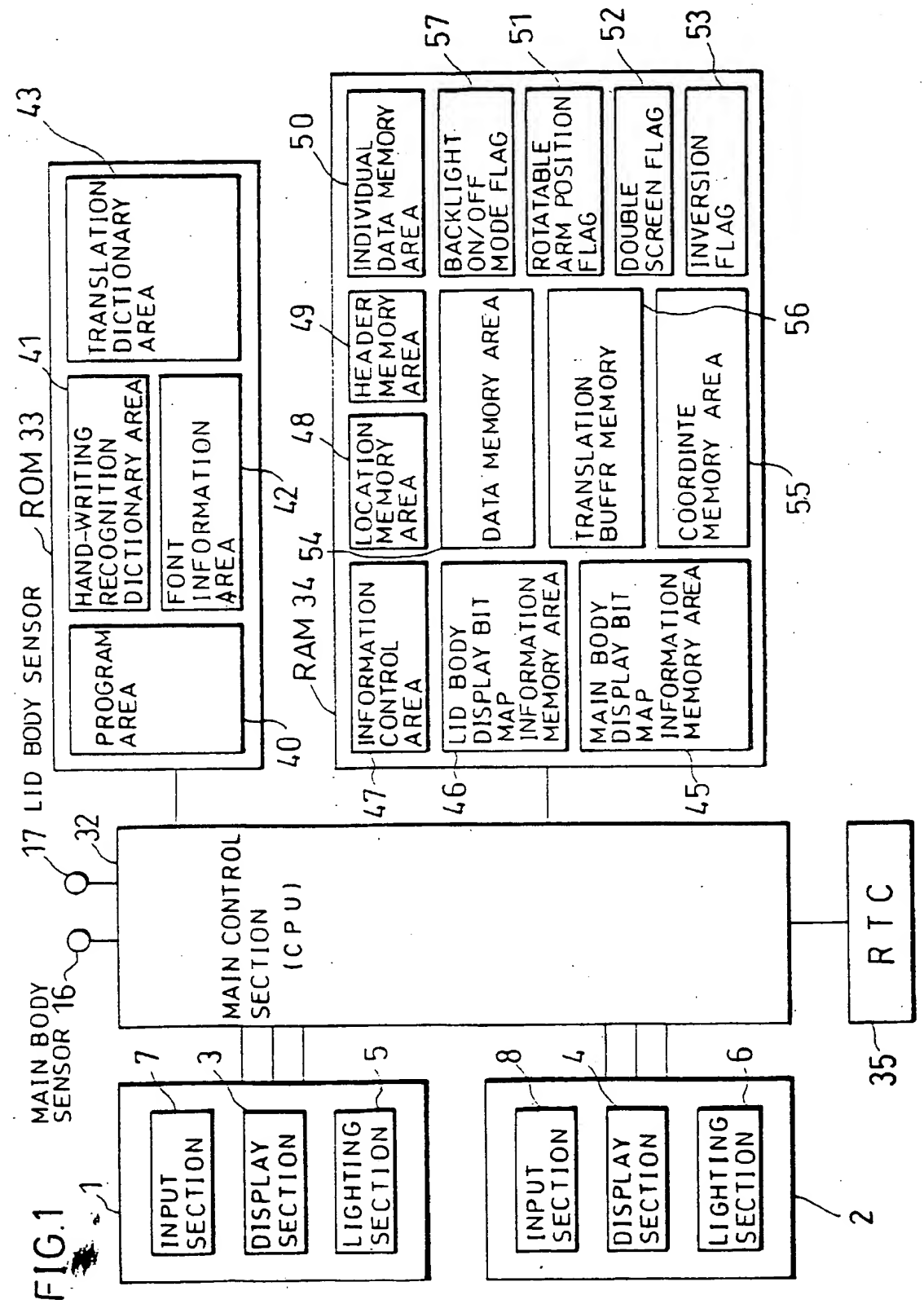

INPUT SECTION
DISPLAY SECTION
LIGHTING SECTION
INPUT SECTION
DISPLAY SECTION
LIGHTING SECTION
MAIN BODY SENSOR 16
17 LID BODY SENSOR
MAIN CONTROL SECTION (CPU)
RTC
ROM 33
PROGRAM AREA
HAND-WRITING RECOGNITION DICTIONARY AREA
FONT INFORMATION AREA
TRANSLATION DICTIONARY AREA
RAM 34
INFORMATION CONTROL AREA
LID BODY DISPLAY BIT MAP INFORMATION MEMORY AREA
MAIN BODY DISPLAY BIT MAP INFORMATION MEMORY AREA
LOCATION MEMORY AREA
DATA MEMORY AREA
TRANSLATION BUFFR MEMORY
COORDINTE MEMORY AREA
HEADER MEMORY AREA
INDIVIDUAL DATA MEMORY AREA
BACKLIGHT ON/OFF MODE FLAG
ROTATABLE ARM POSITION FLAG
DOUBLE SCREEN FLAG
INVERSION FLAG
1
2
3
4
5
6
7
8
32
35
40
41
42
43
45
46
47
48
49
50
51
52
53
54
55
56
57

FIG.1

FIG. 3

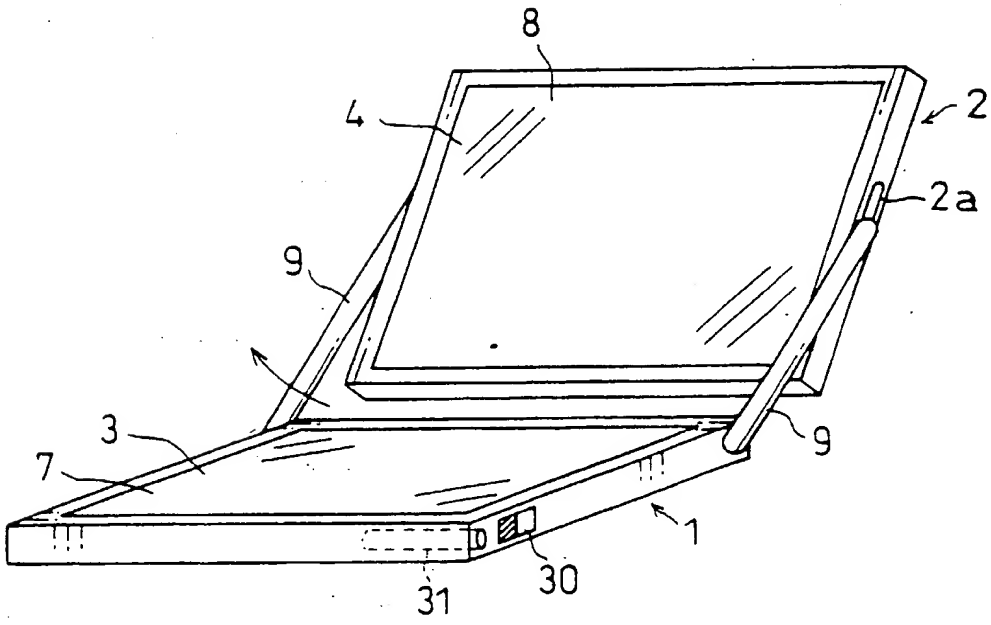


FIG. 5

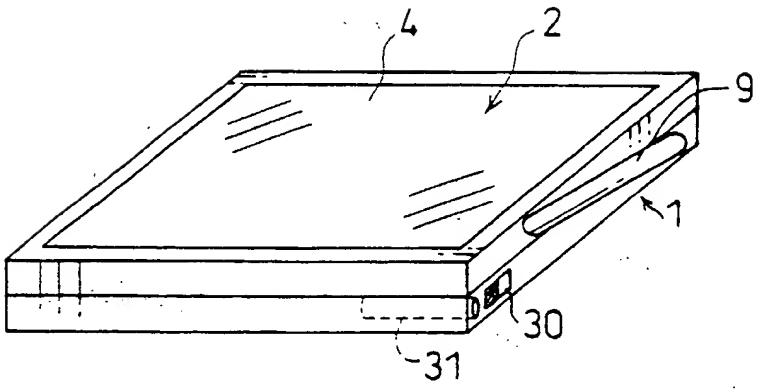


FIG. 7(a)

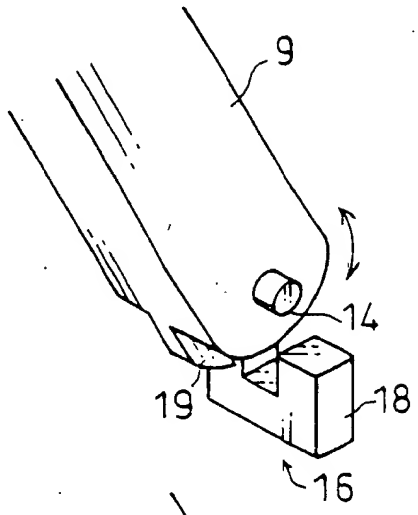


FIG. 7(b)

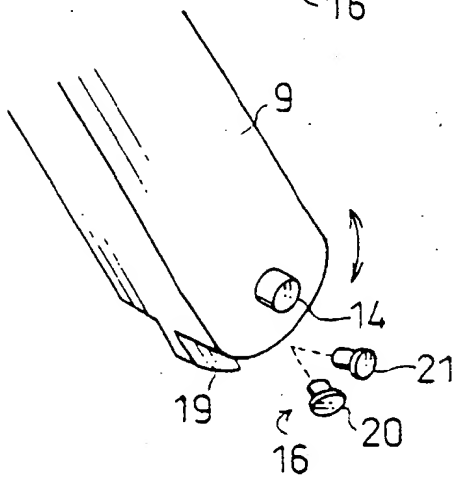


FIG. 7(c)

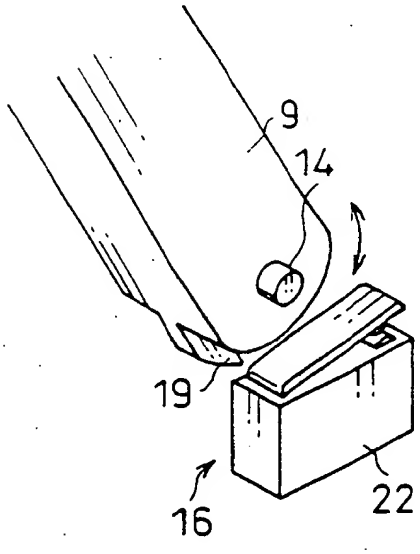


FIG. 9

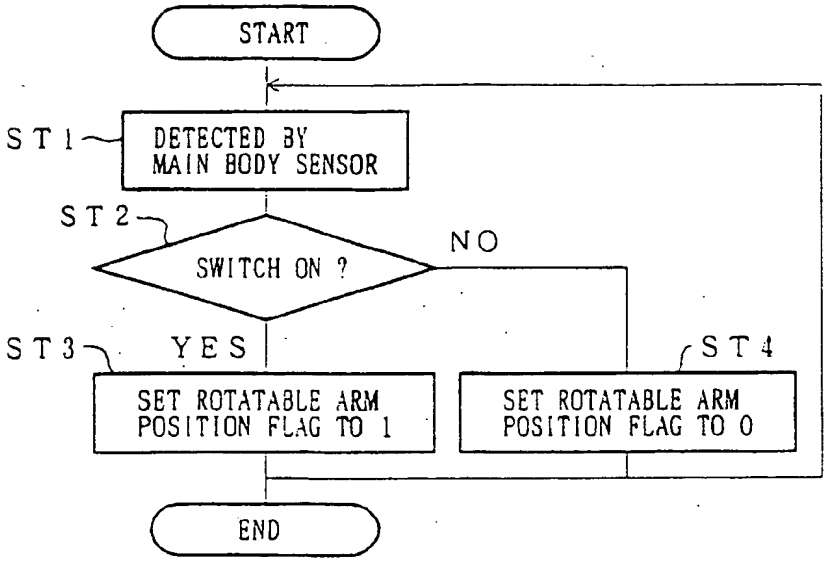

START
ST 1
DETECTED BY MAIN BODY SENSOR
ST 2
SWITCH ON ?
NO
YES
ST 3
ST 4
SET ROTATABLE ARM POSITION FLAG TO 1
SET ROTATABLE ARM POSITION FLAG TO 0
END

FIG. 10

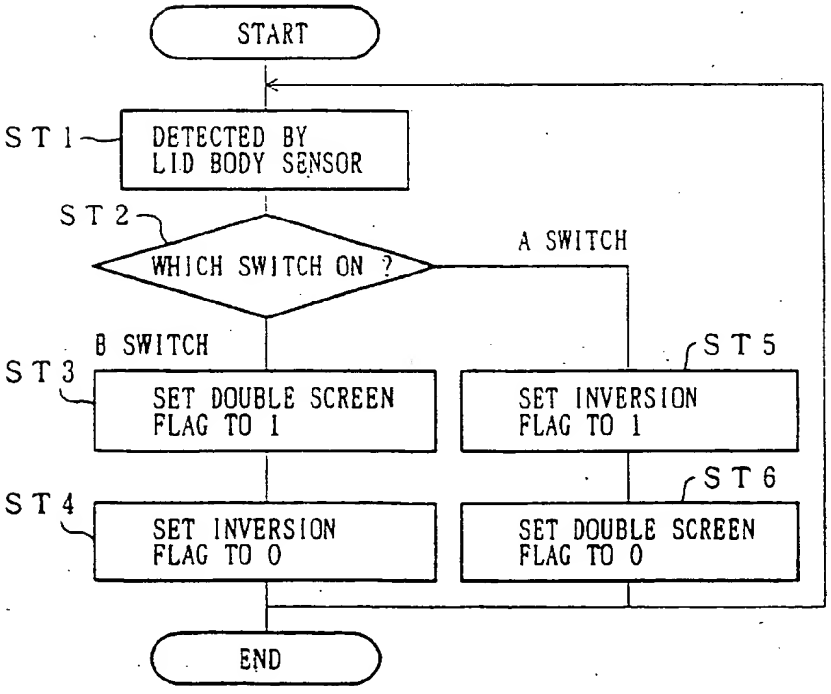

START
ST 1
DETECTED BY LID BODY SENSOR
ST 2
WHICH SWITCH ON ?
A SWITCH
B SWITCH
ST 3
ST 4
ST 5
ST 6
SET DOUBLE SCREEN FLAG TO 1
SET INVERSION FLAG TO 1
SET INVERSION FLAG TO 0
SET DOUBLE SCREEN FLAG TO 0
END

FIG. 11 (b)

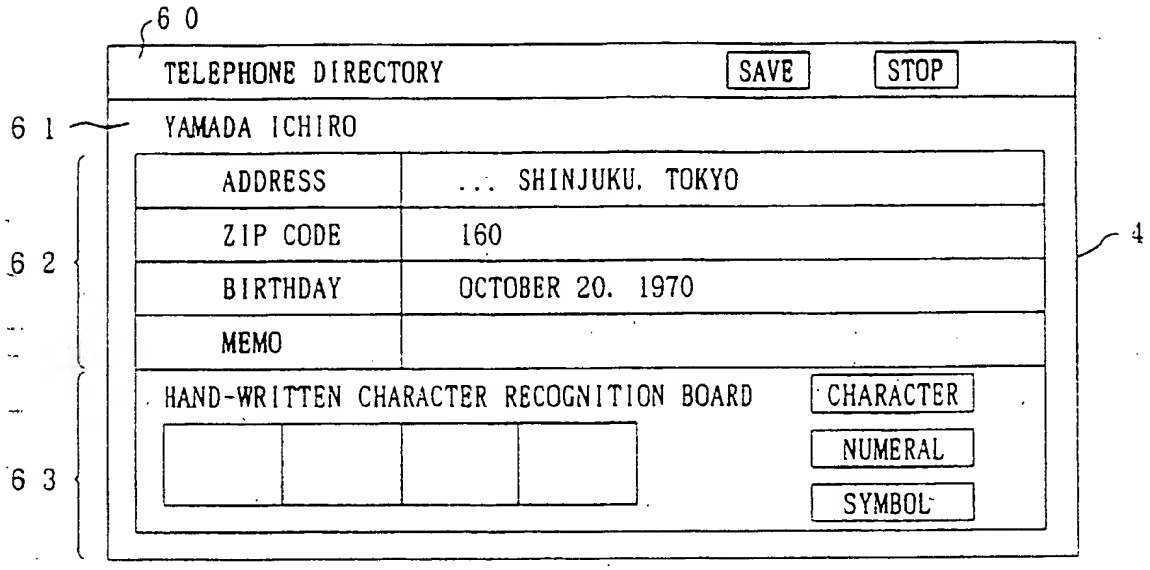

60
TELEPHONE DIRECTORY
SAVE
STOP
61
YAMADA ICHIRO
ADDRESS
... SHINJUKU. TOKYO
ZIP CODE
160
62
BIRTHDAY
OCTOBER 20. 1970
MEMO
4
HAND-WRITTEN CHARACTER RECOGNITION BOARD
CHARACTER
NUMERAL
SYMBOL
63

FIG. 13

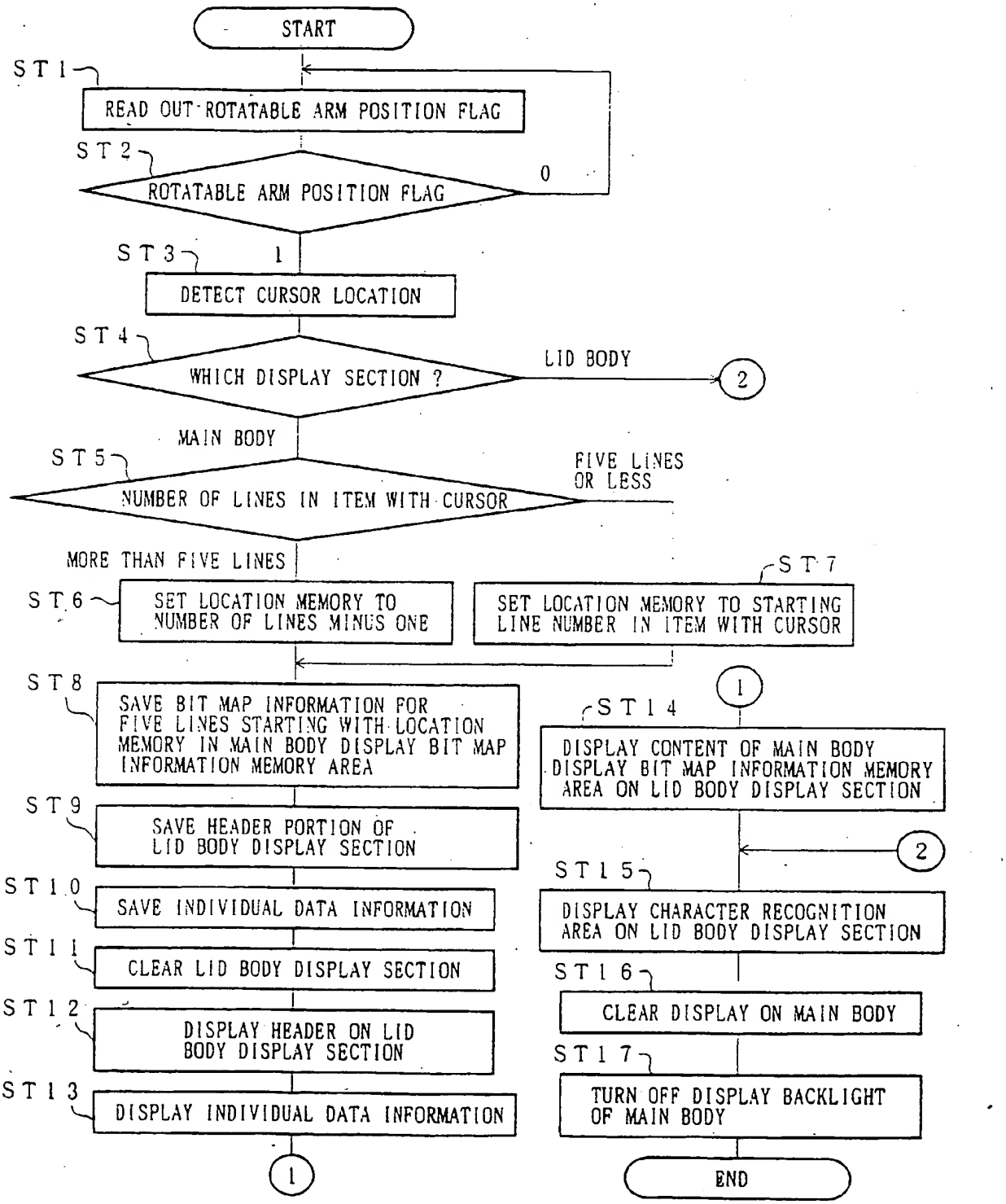

START
ST1
READ OUT ROTATABLE ARM POSITION FLAG
ST2
ROTATABLE ARM POSITION FLAG
0
1
ST3
DETECT CURSOR LOCATION
ST4
WHICH DISPLAY SECTION ?
LID BODY
2
MAIN BODY
ST5
NUMBER OF LINES IN ITEM WITH CURSOR
FIVE LINES OR LESS
MORE THAN FIVE LINES
ST6
SET LOCATION MEMORY TO NUMBER OF LINES MINUS ONE
ST7
SET LOCATION MEMORY TO STARTING LINE NUMBER IN ITEM WITH CURSOR
ST8
SAVE BIT MAP INFORMATION FOR FIVE LINES STARTING WITH LOCATION MEMORY IN MAIN BODY DISPLAY BIT MAP INFORMATION MEMORY AREA
ST9
SAVE HEADER PORTION OF LID BODY DISPLAY SECTION
ST10
SAVE INDIVIDUAL DATA INFORMATION
ST11
CLEAR LID BODY DISPLAY SECTION
ST12
DISPLAY HEADER ON LID BODY DISPLAY SECTION
ST13
DISPLAY INDIVIDUAL DATA INFORMATION
1
1
ST14
DISPLAY CONTENT OF MAIN BODY DISPLAY BIT MAP INFORMATION MEMORY AREA ON LID BODY DISPLAY SECTION
2
ST15
DISPLAY CHARACTER RECOGNITION AREA ON LID BODY DISPLAY SECTION
ST16
CLEAR DISPLAY ON MAIN BODY
ST17
TURN OFF DISPLAY BACKLIGHT OF MAIN BODY
END

FIG. 15

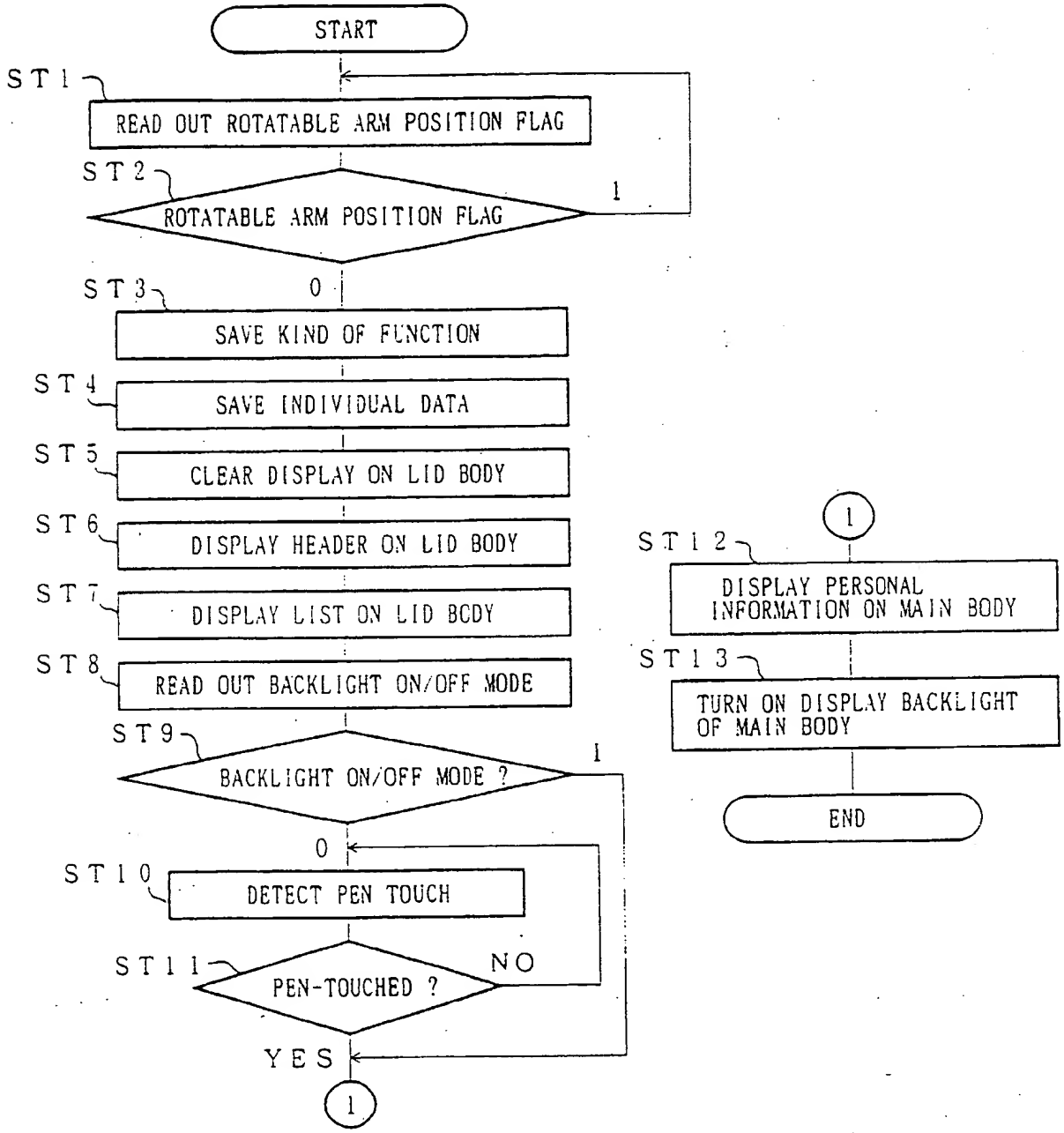

START
ST1
READ OUT ROTATABLE ARM POSITION FLAG
ST2
ROTATABLE ARM POSITION FLAG
1
0
ST3
SAVE KIND OF FUNCTION
ST4
SAVE INDIVIDUAL DATA
ST5
CLEAR DISPLAY ON LID BODY
ST6
DISPLAY HEADER ON LID BODY
ST7
DISPLAY LIST ON LID BODY
ST8
READ OUT BACKLIGHT ON/OFF MODE
ST9
BACKLIGHT ON/OFF MODE ?
1
0
ST10
DETECT PEN TOUCH
ST11
PEN-TOUCHED ?
NO
YES
1
1
ST12
DISPLAY PERSONAL INFORMATION ON MAIN BODY
ST13
TURN ON DISPLAY BACKLIGHT OF MAIN BODY
END

FIG. 17

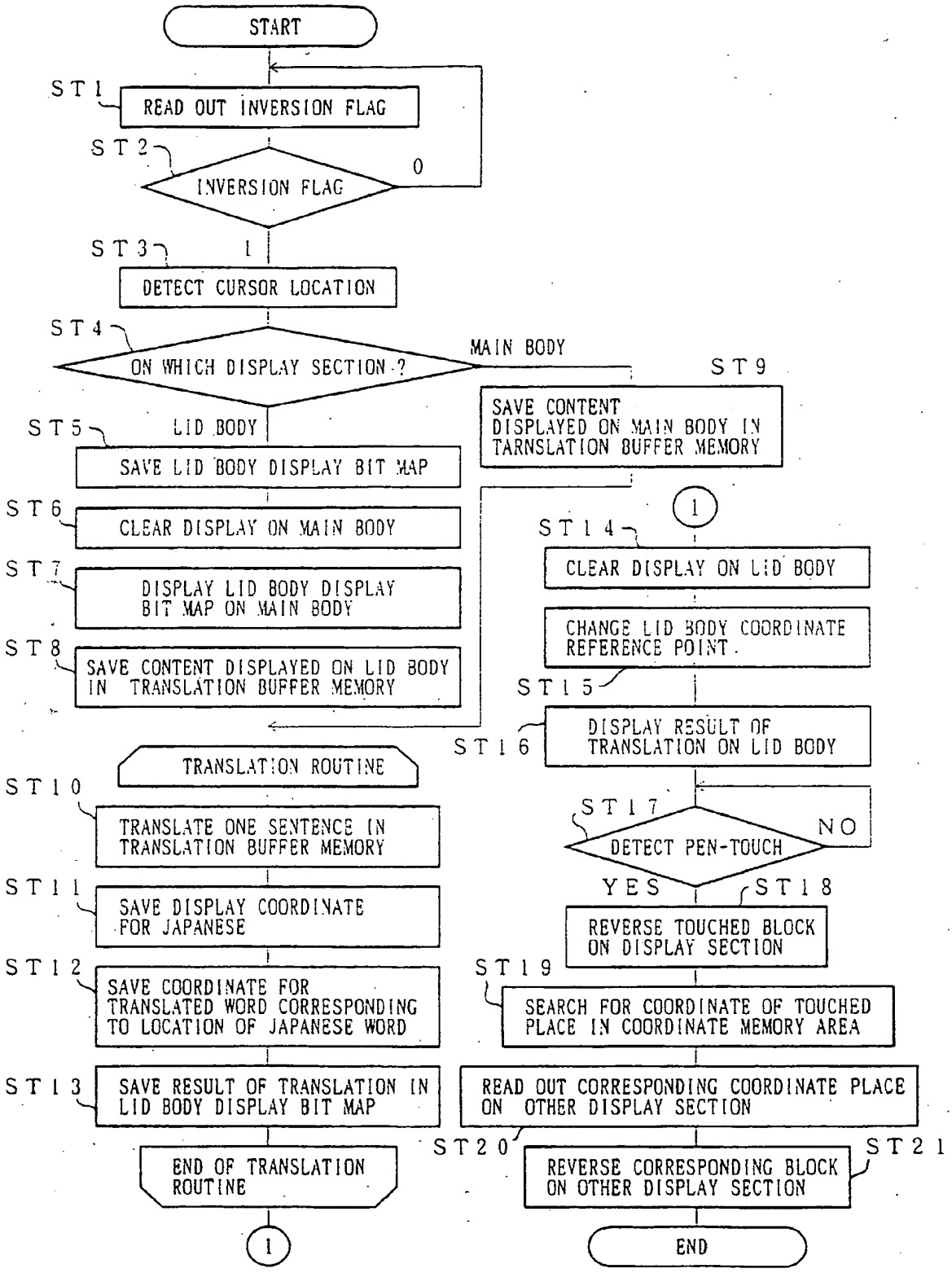

START
ST1
READ OUT INVERSION FLAG
ST2
INVERSION FLAG
0
1
ST3
DETECT CURSOR LOCATION
ST4
ON WHICH DISPLAY SECTION ?
MAIN BODY
LID BODY
ST5
SAVE LID BODY DISPLAY BIT MAP
ST6
CLEAR DISPLAY ON MAIN BODY
ST7
DISPLAY LID BODY DISPLAY BIT MAP ON MAIN BODY
ST8
SAVE CONTENT DISPLAYED ON LID BODY IN TRANSLATION BUFFER MEMORY
ST9
SAVE CONTENT DISPLAYED ON MAIN BODY IN TARNSLATION BUFFER MEMORY
1
ST14
CLEAR DISPLAY ON LID BODY
CHANGE LID BODY COORDINATE REFERENCE POINT
ST15
ST16
DISPLAY RESULT OF TRANSLATION ON LID BODY
ST17
DETECT PEN-TOUCH
NO
YES
ST18
REVERSE TOUCHED BLOCK ON DISPLAY SECTION
ST19
SEARCH FOR COORDINATE OF TOUCHED PLACE IN COORDINATE MEMORY AREA
READ OUT CORRESPONDING COORDINATE PLACE ON OTHER DISPLAY SECTION
ST20
ST21
REVERSE CORRESPONDING BLOCK ON OTHER DISPLAY SECTION
END
TRANSLATION ROUTINE
ST10
TRANSLATE ONE SENTENCE IN TRANSLATION BUFFER MEMORY
ST11
SAVE DISPLAY COORDINATE FOR JAPANESE
ST12
SAVE COORDINATE FOR TRANSLATED WORD CORRESPONDING TO LOCATION OF JAPANESE WORD
ST13
SAVE RESULT OF TRANSLATION IN LID BODY DISPLAY BIT MAP
END OF TRANSLATION ROUTINE
1

FIG.19 (a)

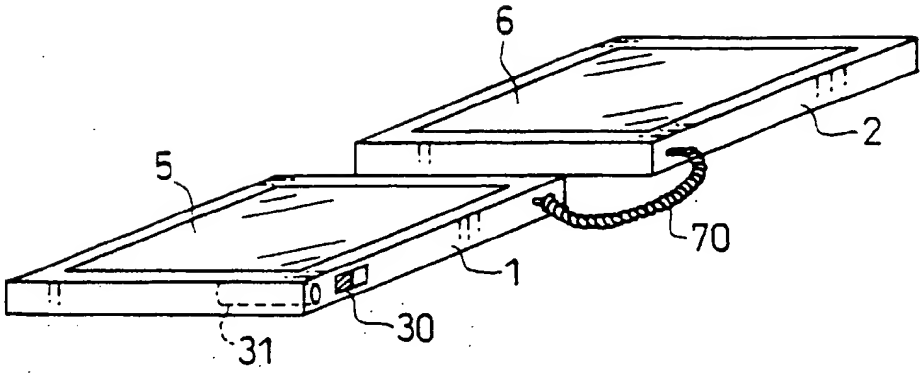


FIG.19 (b)

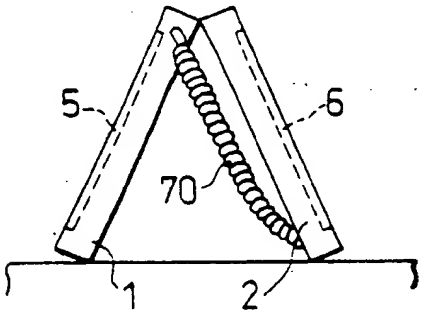
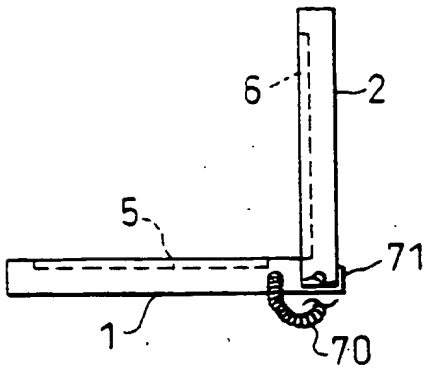


FIG.19 (c)



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 807 879 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
20.01.1999 Bulletin 1999/03

(43) Date of publication A2:
19.11.1997 Bulletin 1997/47

(21) Application number: **97302491.2**

(22) Date of filing: **11.04.1997**

(51) Int Cl.[6]: **G06F 1/16**

(84) Designated Contracting States:
DE GB IT

(30) Priority: **17.05.1996 JP 123039/96**

(71) Applicant: **SHARP KABUSHIKI KAISHA**
Osaka-shi, Osaka-fu 545 (JP)

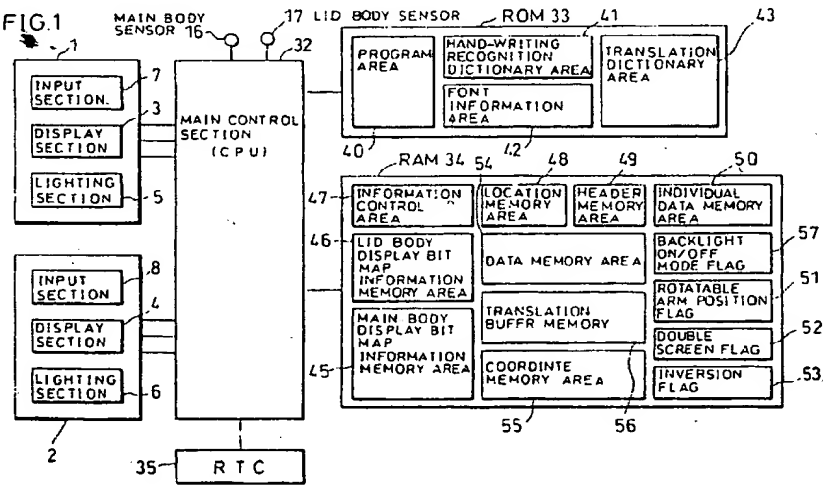
(72) Inventors:
- **Haneda, Isamu**
  Soraku-gun, Kyoto 619-11 (JP)
- **Isoe, Toshio**
  Tenri-shi, Nara 632 (JP)

(74) Representative: **Brown, Kenneth Richard et al**
R.G.C. Jenkins & Co.
26 Caxton Street
London SW1H 0RJ (GB)

(54) Information processing apparatus including a main body and a lid body

(57) An information processing apparatus having a main body and a lid body is configured so that the lid body can be switched between a closed state, a stacked state, a double screen state and an inverted state. Each of the main body and the lid body has a display section for displaying information and an input section composed of a transparent tablet and provided on the display section. As a sensor or the like detects the lid body in one of the four states, a control section of the information processing apparatus controls the display section so that a screen on the display section is appropriate to the detected state of the lid body. The control section also controls the lighting section for lighting the display section appropriately to the detected state of the lid body. This realizes appropriate display in accordance with usages of the information processing apparatus and offers an easy-to-operate and easy-to-use information processing apparatus. Besides, the lighting section is turned on/off according to needs, and therefore it is possible to prevent heat generation and to restrain power consumption.

FIG.1



EP 0 807 879 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 30 2491

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	EP 0 458 316 A (TOKYO SHIBAURA ELECTRIC CO) 27 November 1991 * column 16, line 7 - line 57; figures 17-32 *	13-15,17	
Y	WO 95 24007 A (LANE JEFFREY P) 8 September 1995 * page 5, line 23 - page 6, line 6 * * page 7, line 30 - page 8, line 19; claims 1,2,9,13; figures *	7	
Y	DE 94 06 985 U (WOITZEL INGBUERO IBW) 31 August 1995 * the whole document *	7,13-15, 17	
Y	EP 0 454 120 A (KK. TOSHIBA) 30 October 1991 * column 19, line 38 - line 54 * * column 22, line 10 - line 18; figures *	13-15,17	
Y	EP 0 626 632 A (SHARP KK) 30 November 1994 * column 34, line 32 - line 54 * * column 37, line 34 - line 48 * * column 42, line 42 - line 44 * * column 43, line 10 - line 17; claims 14,16,18; figures 33-35,44 *	13	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Y	"FLEXIBLE LAYOUT PRICE LOOK-UP KEYBOARD DISPLAY" IBM TECHNICAL DISCLOSURE BULLETIN, vol. 35, no. 5, 1 October 1992, pages 420-421, XP000313033 * the whole document *	13	
A	EP 0 645 726 A (AT & T GLOBAL INF SOLUTION) 29 March 1995 * abstract * * column 3, line 18 - line 58; figure 3 *	8,9,15, 17	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	20 November 1998	Durand, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)